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L. O. HOWARD, Entomologist and Chief of Bureau.

THE COTTON STAINER.

BY

W. D. HUNTER,

In Charge of Southern Field Crop Insect Investigations.

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CIRCULAR NO. 149. Issued April 8, 1912.

United States Department of Agriculture,

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L. O. HOWARD, Entomologist and Chief of Bureau.

THE COTTON STAINER,

(*Dysdercus suturellus* H.-Schf.)

By W. D. HUNTER,

In Charge of Southern Field Crop Insect Investigations.

INTRODUCTION.

The cotton stainer (*Dysdercus suturellus* H.-Schf.) is the only representative in the United States of a large group of species which includes the most important enemies of cotton in tropical countries.

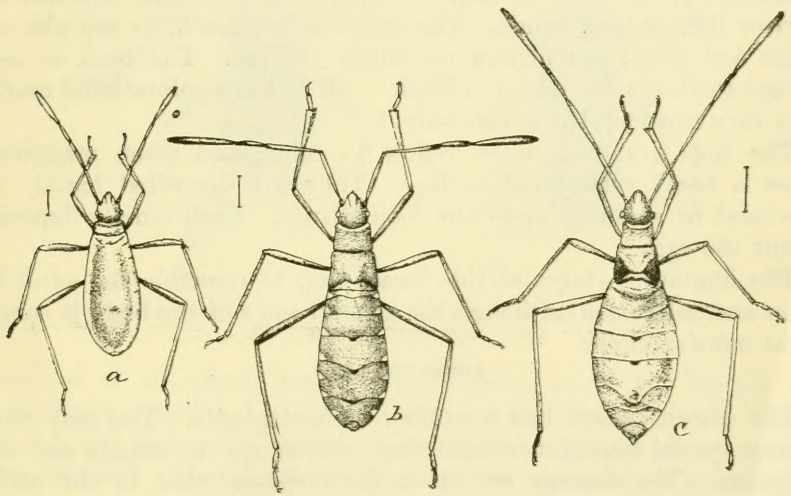

FIG. 1.—The cotton stainer (*Dysdercus suturellus*): *a*, Nymph, or larva, first stage; *b*, nymph, second stage; *c*, nymph, third stage. Enlarged. (From Insect Life.)

There are 28 species of the genus known in the Americas. The form which occurs in the United States is not of very great importance, on account of its local restriction, but in Florida it is undoubtedly the most important cotton insect that exists at present. It has been known as an enemy to cotton in that State for many years, but has never shown any tendency to spread to other regions.

DISTRIBUTION.

The cotton stainer of the United States is known only from Florida, Georgia, and portions of South Carolina and Alabama. Except in Florida it occurs in small numbers.

Outside of the United States this insect is known from the upper West Indian Islands, namely, Bahamas, Cuba, and Porto Rico. There is a doubtful record of its occurrence in Brazil. The evidence available at this time seems to show rather conclusively, however, that it does not extend south of Porto Rico. In the lower islands of the West Indies it is replaced by other species.

DESCRIPTION.

The following description of the adult insect is taken from an account by Dr. L. O. Howard.[1]

"The adult bug varies in length from 10 mm. to 15 mm. (0.4 to 0.6 inch). The hinder portion of the thorax and of the wing-covers varies from dark brown to black, the latter being crossed with narrow lines of light yellow, as shown in Figure 52, *b* [fig. 2, *b*]. The head and forepart of the thorax are red, varying from light to dark. The underside of the body is bright red, with the segments outlined by narrow light-yellow bands. The antennæ are black, as are also all tibiæ and tarsi; the femora or thighs are red. The beak is red, except the last joint which is black. All of these colorational markings vary considerably in intensity."

The eggs are oval, light yellow in color, and when magnified show a finely reticulated surface. They are deposited loosely in the sand or earth or upon the food plants. Each female deposits about 100 eggs.

The immature stages of this insect (fig. 1) resemble the adult in form and coloration, although the general color of the body is somewhat more reddish.

FOOD PLANTS.

The cotton stainer has a number of food plants. The only ones of any special importance aside from cotton are the orange and the eggplant. The damage to cotton far surpasses that to the other plants. In the case of the orange the habit of the insect is to attack the fruit at about the time it is ripening. This is evidently a temporary habit, probably induced by the general scarcity of the normal food plants at the time the oranges are ripening. The injury to eggplants was recorded in 1896 by Prof. A. L. Quaintance, but does not seem to have been considerable.

Among the wild plants upon which this insect feeds are *Hibiscus* sp., as well as several others including guava, Spanish cocklebur

[1] Insect Life, vol. 1, pp. 237-238, 1889.

(*Urena lobata*), and nightshade (*Solanum nigrum*). Observations made in the vicinity of Orlando, Fla., by Dr. A. W. Morrill, indicate that the Spanish cocklebur is probably the most important of these plants.

DAMAGE.

From observations made in the Bahamas in 1878, Mr. E. A. Schwarz concluded that this species is an enemy of cotton of very great importance in those islands. In Florida the damage is scattered and naturally difficult to estimate. In one instance, pointed out by Dr. Morrill, the complete destruction of 25 acres of long-staple cotton was attributed to this insect. Generally, however, the injury does not extend further than the staining of a portion of the crop

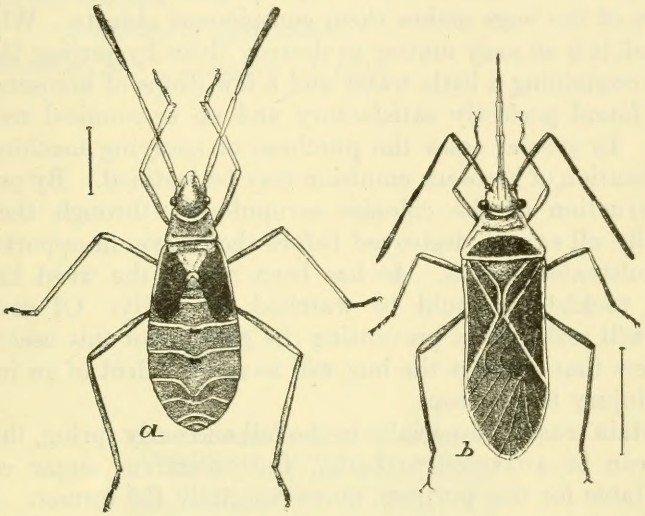

FIG. 2.—The cotton stainer: *a*, Fourth-stage nymph, or pupa; *b*, adult. Enlarged. (From Insect Life.)

produced on the plantation. A case referred to by Dr. Morrill[1] is undoubtedly typical. In this instance at Hawthorn, Fla., in 1902, about 1,000 bales of long-staple cotton were ginned at a certain establishment. Out of this number 200 bales were classed as stained. Staining reduces the value of the cotton in varying degrees, running from 50 per cent in severe cases down to 5 or 10 per cent.

It has generally been supposed that the staining of the fiber was due to the excrement of the insect, but Dr. Morrill's observations in Florida seem to indicate that this is not the true explanation. From studies in the fields and experiments in rearing cages he came to the conclusion that the staining of the lint is the result of the attack of the insects upon immature bolls, and especially on the seed

[1] Bul. 86, Bur. Ent., U. S. Dept. Agr., 1910, p. 97.

at about the time of the opening of the bolls. The brownish color appears to arise from the injured seed. At any rate the examination of considerable seed cotton showed practically invariably that the stain was most dense immediately surrounding the seed. Another reason for the conclusion at which Dr. Morrill arrived was that the amount of staining found was generally entirely too great to be accounted for by the excrement of the insect, although there is no doubt that a portion of this stain is due to that cause.[1]

REPRESSION.

One habit of the insect makes it amenable to simple control measures. This is its tendency to develop in close colonies restricted for a long time to one or at most to a very few plants. At such times the red color of the bugs makes them conspicuous objects. When they are found, it is an easy matter to destroy them by jarring them into buckets containing a little water and a few drops of kerosene. This will be found perfectly satisfactory and an economical method of control. In special cases the purchase of spraying machinery and the application of kerosene emulsion may be justified. By practicing the destruction of the colonies scrupulously through the season practically all can be destroyed before they have an opportunity to injure cultivated plants. As has been noted, the weed known as Spanish cocklebur should be watched especially. Of course the planter will realize that preventing the growing of this useless plant and others that support the bug will have the effect of an insurance against injury to his crops.

At certain seasons, especially in the fall and early spring, the cotton stainer can be attracted to baits. Cottonseed or sugar cane are very suitable for this purpose, more especially the former. If small heaps of cottonseed are placed in the cotton fields or in their immediate vicinity, it will be found that they soon become densely covered by the stainers. At such times they may easily be destroyed by the use of hot water or kerosene.

Mr. P. L. Guppy has published an account (Cir. No. 6, Board of Agriculture of Trinidad and Tobago, Dec. 17, 1911) of experiments in using baits formed of seed cotton for attracting the stainers. Small balls of seed cotton were hung on the cotton plants. These balls consisted of a large handful of seed cotton wrapped with twine. It was found that large numbers of the stainers were attracted to these balls. At intervals of several days the balls were carefully removed from the plants and shaken over receptacles containing oil. It is

[1] Recently Mr. P. L. Guppy (Cir. No. 6, Board of Agriculture of Trinidad and Tobago, p. 131, Dec. 17, 1911) verified Dr. Morrill's finding as to the origin of the stain. He states: "The damage is done before the bolls open by the insect piercing the walls in order to obtain the juices and the cell sap exudes through the punctures thus made to the cotton lint which is being formed inside the boll." This statement refers to *Dysdercus howardi* Ballou.

very doubtful whether this method will be found of practical use in the United States, but it seems worthy of trial.

We may summarize the feasible means of control in their order of importance as follows:

1. The prevention of the growth of the weeds upon which the cotton stainer breeds in great numbers.

2. The destruction, by means of kerosene and water, of the colonies of young bugs as soon as they make their appearance during the growing season.

3. The attracting of the insects to small piles of cotton seed and their destruction when congregated in large numbers by means of hot water or kerosene.

Approved:

JAMES WILSON,

Secretary of Agriculture.

WASHINGTON, D. C., *January 18, 1912.*

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